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From Visit to Action: How Zoo Visitor Characteristics Influence Environmentally-Responsible Behavior

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FROM VISIT TO ACTION: HOW ZOO VISITOR CHARACTERISTICS INFLUENCE ENVIRONMENTALLY-RESPONSIBLE BEHAVIOR

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ABSTRACT

Over the last 30 years, AZA-accredited zoos and aquariums have shifted focus from recreation to become centers of research, conservation and education. As awareness of environmental issues increases, zoos around the world have stepped up the challenge of engaging their visitors in learning experiences to enhance knowledge and awareness of conservation initiatives and eventually evoke action. Evaluation of these educational programs has also shifted from assessing whether a program works to determining for whom it works and why. The purpose of this study is to explore the role of locus of control, motivation, previous life experiences, personal interest and knowledge on the effectiveness of a zoo program designed to stimulate environmentally-responsible behavior (ERB). A web-based survey and mail-back paper survey were used to evaluate the effectiveness of the education program in terms of environmentally-responsible behavior and understand what visitor characteristics influence an individual to participate in ERB. Responses were received from 546 visitors. The survey instrument included an environmentally-themed locus of control scale, questions to understand visit motivation, various assessments of previous life experiences, a personal interest and perceived knowledge scale, and an objective knowledge test. To evaluate these variables in terms of environmentally-responsible behavior, a 21 item list of action behaviors was complied from conservation messages around the zoo.

Results indicated significant positive relationships between environmentally-responsible behavior and several independent variables including internal locus of

control, educational motivation, attendance at educational attractions, owning a variety of pets, personal interest, higher perceived and objective knowledge of animal and conservation issues, and attendance at special summer exhibits. Program implementation limited the study results due to ineffective distribution of program brochures and less than ideal sign placement.

The results indicate that no one variable is so highly correlated that it alone could influence environmentally-responsible behavior. Rather it is a combination of many environmental and conservation-related experiences that prepares a zoo visitor for a meaningful learning experience. Also, Affirmation of environmental attitudes and beliefs plays a large role in encouraging visitors to continue acting in an environmentally-responsible way.

DEDICATION

I would like to dedicate this thesis to my parents, Dan and Patricia Joseph, who have always encouraged me to explore my opportunities. From the beginning, you took the time to drive me to softball, dancing, theater, and voice and your support extended throughout college. Every time I came home and told you I was going to change my major, you just smiled and offered your love. You have been patient with me as I interned all over the place trying out different jobs hoping to find my passion. Now, I only hope that my enthusiasm for wildlife and conservation education will shine through, and I can make you proud once again when I finally find a "real job" that I love.

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INTRODUCTION

Introduction

For many people, the zoo is a novel environment to spend time with friends and family. People gather to enjoy a nice day watching the lions basking in the sun or laugh as the chimpanzees swing across the ropes in their enclosure. This leisure setting fosters a casual mindset toward learning. Therefore, motivations to learn about wildlife and learn new environmental behaviors may not be a top priority for many visitors (Morgan & Hodgkinson, 1999). However, over the last 30 years zoos all over the world have shifted focus from animal exhibition to conservation education (WAZA, 2005). Through educational signage, programs, exhibit design and interaction with staff and volunteers, zoos are providing opportunities for their visitors to learn about conservation and offering practical suggestions for environmental action by individuals. With the Association of Zoos and Aquariums (AZA) reporting attendance figures at zoos of 143 million people in North America and the World Association of Zoos and Aquariums (WAZA) reporting a worldwide visitation of almost 600 million people each year, there are many opportunities to provide educational outreach to visitors. However, zoo visitors arrive with a wide array of motivations, interests and prior knowledge regarding wildlife conservation and environmental issues. This makes the design and implementation of educational initiatives and messages more challenging.

Zoos and aquariums provide the general public opportunities to observe and learn about species from all over the world. It is through these direct emotional and cognitive experiences that sometimes result from interactions with wildlife at zoos that visitors may evolve from spectators to participants in wildlife conservation (Fraser & Wharton, 2007). Free-choice learning opportunities at a modern zoo are available at most exhibits, but the visitors choose whether to interact with these educational materials (Tofield, Coll, Vyle & Bolstad, 2003; Falk, 2005). Through evaluation of programs, exhibits and signage, zoo education employees can improve their judgment about which elements are most effective and make necessary changes to increase visitor interest, involvement, and retention of wildlife conservation messages. In fact, a study of North American zoos documented an increase in wildlife research programs over the years, and the number of evaluations of education efforts has increased as well (Stoinski, Lukas & Maple, 1998). These education research initiatives can improve the efficiency and effectiveness of educational programming in free-choice learning environments.

Unfortunately, some conservation education exhibit elements such as signage and programs seem well designed but are not reaching a majority of zoo visitors. In these cases, it may be that the visitors were simply not interested in the educational offerings. Some studies have looked at visitor learning styles or motivations to determine whether program elements are effectively catching visitors' attention and involvement or creating meaningful learning about wildlife (Morgan & Hodgkinson, 1999; Serrell, 1993). A few studies have focused on the importance of the visitor's previous experiences and knowledge regarding wildlife and the environment. Falk and Adelman (2003) surveyed

visitors as they entered and exited an aquarium to see if their previous objective knowledge and interests affected their learning from exhibits. Visitors with low knowledge but high interest in the subject tended to retain the most information.

Other characteristics such as knowledge, attitude/affect, and behavior (KAAB) and locus of control have been tested in a variety of settings to better understand visitors' and staff's intention to participate in environmentally-responsible behavior. Results show that working in an environmentally-themed environment does affect employees' KAAB and environmentally-responsible behavior outside of work (Groff, Lockhart, Ogden & Dierking, 2005). Also, visitors' intention to act in an environmentally-responsible way is dependent on a combination of interest, knowledge, experience, concern, and commitment developed over a lifetime (Dierking, Adelman, Ogden, Lehnhardt, Miller & Mellen, 2004). Locus of control can also influence a visitor's intention to act. If visitors with an external locus of control believe that certain environmental issues are beyond their control, they may feel that their actions will have no real affect on the problems. Although there are been numerous studies evaluating the role locus of control plays in determining an individual's decision regarding environmentally-responsible behavior, there have been few studies incorporating the influence of locus of control on learning in an informal setting and its affect on environmentally-responsible behaviors.

Clearly, evaluation of informal learning is evolving. In the past, evaluative studies simply tried to document that a program was working. Little effort was made to understand why or how a program worked or for whom it did or did not work. As

evaluation techniques are refined, researchers can not only evaluate the success of the program but also how and why it was successful (Pawson & Tilley, 1997).

During the summer of 2007, a large Midwestern zoo implemented a new educational program. An effort was made to evaluate whether certain sets of variables could explain individual differences in outcomes of a novel zoo education program. Dr. Zoolittle: Quest for the Key was a theatrical animal show that informed audience members that their environmentally-responsible behaviors are the "key to the future for wildlife." The theme of action by visitors appeared again in two other temporary exhibits, a salt water touch tank exhibit with sharks and stingrays and an animatronic dinosaur display. Outcomes of the program were measured in terms of environmentally-responsible behavior.

Problem Statement

The purpose of this study is to explore the role of locus of control, motivation, previous life experiences, personal interest and knowledge on the effectiveness of a zoo program designed to stimulate environmentally-responsible behavior.

Research Questions

1) Is the visitor's locus of control related to the visitor's response to environmental action behaviors?

2) Is the visitor's motivation-related identity related to the visitor's response to environmental action behaviors?

3) Do certain life experiences affect the visitor's response to environmental action behaviors?

4) Is the visitor's personal interest related to visitor's response to environmental action behaviors?

5) Is the visitor's perceived knowledge related to visitor's response to environmental action behaviors?

6) Is the visitor's objective knowledge related to visitor's response to environmental action behaviors?

7) How is attendance at one or more of the educational components related to environmental action behaviors?

Hypotheses

H_1 – Visitors determined to have an internal locus of control will be more likely to continue, increase or start environmentally-responsible behavior than visitors determined to have an external locus of control.

H_2 – Visitors with an educational motivation-related identity will be more likely to continue, increase or start environmentally-responsible behavior than visitors with other motivation-related identities.

H_3 – Visitors with previous life experiences involving animals or the outdoors will be more likely to continue, increase or start environmentally-responsible behavior than visitors with little or no previous experiences involving animals or the outdoors.

H_4 – Visitors with personal interest in environmental and conservation issues will be more likely to continue, increase or start environmentally-responsible behavior than visitors with little personal interest in environmental and conservation issues.

H_5 – Visitors with higher perceived knowledge of environmental and conservation issues will be more likely to continue, increase or start environmentally-responsible behavior than visitors with little perceived knowledge of environmental and conservation issues.

H_6 – **V**isitors who scored higher on the objective knowledge test will be more likely to continue, increase or start environmentally-responsible behavior than visitors that scored lower on the objective knowledge test.

H_7 – Visitors attending two or all three components of the educational program will be more likely to start or increase environmentally-responsible behavior than visitors attending less than two components of the educational program.

Definitions

- Environmental education
    - "Environmental education is a learning process that increases people's knowledge and awareness about the environment and associated challenges, develops the necessary skills and expertise to address these challenges, and fosters attitudes, motivations, and commitments to make informed decisions and take responsible action" (National Environmental Education Advisory Council, 1996, p.i).
- Interpretation
    - "A communication process that forges emotional and intellectual connections between the interests of the audience and the meanings inherent in the resource" (National Association for Interpretation, 2008).
- Free-choice learning
    - "Learning experiences where the learner exercises a large degree of choice and control over the what, when and why of learning" (Falk, 2005, p.265).
- Informal learning
    - Situation in which "opportunities for learning are structured by educators, but the choice of participation is entirely on the part of the individual" (Heimlich, 1993, p.4).
- Environmentally-responsible behavior
    - "Active and considered participation aimed at solving problems and resolving issues. Categories of environmentally responsible actions include persuasion, consumer action, ecomanagement, political action, and legal action" (Environmental Literary Council, 2008).
- Locus of control
    - The extent to which individuals believe their behavior controls the outcomes within their lives (Rotter, 1966).

Rationale for Study

There is a need for research focused on how visitors experience zoos and the impact of their values and beliefs have on possible learning experiences. More importantly, zoos need to understand how these experiences translate into taking action to protect animals and the environment (Dierking, 2004).

Organization of the Thesis

The introduction is followed by a review of the literature about free choice learning, the relationship of visitors' previous knowledge and interest with learning and retention, and the research that discusses environmentally responsible behavior (Chapter two). Chapter three outlines the study setting, the education program that was implemented, the selection of participants, measurement tools, data collection procedures, and statistical analysis of the data. Chapter four provides results of the statistical analyses. Chapter five discusses the results and implications for practitioners as well as suggestions for future studies.

CHAPTER TWO
LITERATURE REVIEW

The review of literature is divided into eleven sections. Environmental education and interpretation are defined and followed by a discussion of their increasing importance in zoos. The definition of free-choice learning and the Contextual Model of Learning is then explained, followed by an in depth look at the topics of locus of control, motivation, previous life experiences, knowledge, KAAB (knowledge, attitudes/affect and behavior), and research focusing on environmentally-responsible behavior. The chapter ends with a concluding summary.

Environmental Education and Interpretation

Environmental education and interpretation are used to convey information deemed important by experts in informal learning settings such as zoos. Environmental education focuses on increasing people's knowledge and awareness about the environment and fostering attitudes and motivations so people can take responsible action (National Environmental Education Advisory Council, 1996). Environmental education is curriculum-based and the outcomes are defined by the instructor. Interpretation plays a different role. Interpretation is a communication process that forges emotional and intellectual connections between the interests of the audience and the meanings inherent in the resource (National Association for Interpretation, 2008). Interpretation

concentrates on helping the visitor find personal meaning in and understanding of the resource.

Environmental education and interpretation programs in zoos and museums try to include the four components of natural learning. Natural learning is the "individual process of constructing meaning from information and experience" (Heimlich, 1993). Natural learning must be active, volitional, internally mediated, and an individual process of assigning meaning to new material. Through educational opportunities, visitors actively participate in the learning experience whether they are physically joining in an activity or by reading or listening to available information. This process, motivated by intrinsic factors, allows visitors to take new knowledge and integrate it into their existing cognitive structures (Heimlich, 1993). Environmental educators must find ways to get in touch with the visitor's existing interest in and understanding of the resource to make the experience more meaningful to the visitor.

Education in Zoos

Zoos accredited through the Association of Zoos and Aquariums (AZA) have a distinct responsibility to provide conservation education to the millions that enter their gates each year (Patrick, Matthews, Ayers & Tunnicliffe, 2007). The accreditation guidelines state that education must be mentioned or referred to within the zoo's mission statement (AZA, 2008). The mission statement of each zoo guides all educational endeavors making sure the themes of each program are in line with learning objectives. Zoo education programs aim to educate the public about conservation of biodiversity and

raise awareness of endangered species. Through educational programs and signage, zoo professionals try to instill interest in wildlife and encourage visitors to act in an environmentally-responsible manner. By visiting zoos, visitors encounter many animals that most people would not have the chance to see in the wild. By viewing these animals in close proximity, visitors may form personal connections with the natural world (Kola-Olusanya, 2005; Tribe & Booth, 2003).

With fewer opportunities for humans to interact with nature, zoos become a substitute for viewing wildlife (Kellert, 2002). As many zoos evolve toward more naturalistic exhibits, visitors can observe gorillas foraging for food in a grassy enclosure instead of sitting idly in a concrete cage. These contexts along with first-hand interpretation and educational signage make zoos a venue for visitors to forge emotional connections to wildlife and foster appreciation of the natural world (Tofield, Coll, Vyle & Bolstad, 2003).

Free-Choice Learning

For many people, the term 'learning' evokes thoughts of a structured classroom environment where the teacher presents information that meets predefined and agreed upon performance standards. This formal learning environment typically does not allow its participants to choose their subject matter. Instead, a set curriculum is followed to ensure that students leave with a minimum knowledge of topics deemed important by experts. However, learning does not end when students graduate high school or even college. Learning is a lifelong process (Falk, 2005). Throughout one's life, educational

opportunities are available whether through formal classes, informal learning settings such as museums, park, zoos, etc., or technological sources like the internet. Every day people decide what information to view and retain and what information to ignore. Informal learning settings provide learning opportunities structured by educators but participation is strictly up to the individual (Heimlich, 1993). Many of these decisions are a result of existing knowledge and interest in a subject (Falk, 2005). Therefore, when people visit museums, zoos, parks and nature centers, much of their attention to topics is based on novelty and what they already find interesting.

Most visitors go to the zoo with family and friends to enjoy socializing in a different setting. In fact, Morgan and Hodgkinson (1999) surveyed zoo visitors to systematically describe their motivations for visiting a zoo. Results showed that recreational reasons for zoo visits such as spending time with family and friends were higher ranked than the educational motives. Since the zoo is not school or a formal learning setting, many people who visit do not want to feel pressured to learn during their leisure time. Zoos, aquariums, museums, nature centers, and parks fall into a category known as free-choice learning environments. John Falk (2005) describes free-choice learning as "learning experiences where the learner exercises a large degree of choice and control over the what, when and why of learning." So, visitors to these establishments make personal decisions whether to take the time to read an exhibit sign or stop and talk to an interpreter. The qualities of free-choice learning must be understood by educators at these institutions if they are going to appeal to visitors' motivations, abilities and existing interests.

Some assistance in understanding free-choice learning comes from Packer (2006) who surveyed visitors at six informal learning sites and identified four conditions conducive to the "learning for fun" experience. Many visitors mentioned that learning in the informal setting provided a sense of discovery or fascination, appealed to multiple senses, had the appearance of effortlessness, and provided many choices to appease a variety of interests. Together these elements offered a total experience that allowed the visitor to choose what was interesting and entertaining. These factors can help in designing educational programs and interactive exhibits that draw the visitor into an engaging learning experience. By offering free-choice learning experiences for a range of learning styles including auditory, kinesthetic, tactile, and visual, zoos increase the chances that visitors will take advantage of the educational opportunities provided (Kola-Olusanya, 2005; Thomson & Diem, 1994).

Contextual Model of Learning

To understand the dynamic of factors contributing to the informal learning experience, Falk and Dierking developed the Contextual Model of Learning (Falk & Dierking, 1992, 2000). This model describes the three contexts that influence learning in free-choice settings, including the Personal Context, the Sociocultural Context and the Physical Context. The Personal Context refers to the personal characteristics that the visitor brings to a free-choice learning situation. These include previous knowledge and experience, interests and motivations, and learning style preferences. By focusing on these broad concepts, researchers can begin to understand the personal context of the

learning process. Free-choice learning is facilitated by personal interest and flows from appropriate motivational and emotional cues (Falk & Dierking, 2000). The Sociocultural Context involves the social, cultural and historical components of the free choice learning experience. This typically refers to the concept that learning is not only an individual experience, but it also encompasses the effects of the group dynamic on the visit. The Physical Context suggests that free-choice learning is dependent on the qualities of the physical environment such as sights, sounds and smells.

Many other factors can influence the Personal Context through which visitors construct their zoo experience. The personal characteristics of zoo visitors can be used to help understand the relative impacts of conservation messages presented throughout the zoo and through educational programs. Locus of control, identity and motivations, previous knowledge and attitudes and even demographics have been previously evaluated through social research as being predictive factors related to retention of educational information at free-choice learning facilities and later implementation of environmentally-responsible behaviors (Hwang, Kim & Jeng, 2000; Falk, 2006; Falk, Reinhard, Vernon, Bronnenkant, Deans, & Heimlich, 2007; Bixler, Floyd & Hammitt, 2002; Holzer & Scott, 1997; Falk & Adelman, 2003; Groff, Lockhart, Ogden & Dierking, 2005; Yalowitz, 2004).

Locus of Control

A person's locus of control can have an effect on the decisions he or she makes regarding environmentally-responsible behavior. Locus of control refers to the extent people believe their own actions can shape outcomes within their lives (Rotter, 1966). People with an external locus of control may believe that their actions and efforts have no effect in predicting the outcomes and events in their lives. For example, college students may feel that no matter how hard they try to excel in a class, ultimately, their grade will be determined by what the professor wants to give. Alternately, students with an internal locus of control believe that they have control over their lives and determine the outcomes. So 'internal' college students will spend time studying and working on class work to achieve the grade they want because it is through their own ability and effort that they will receive the grade desired.

Since Rotter's original article in 1966, many variations of the locus of control scale have been designed. Most researchers have modified this scale to test an individual's locus of control pertaining to a specific action to be taken. Within clinical psychology, locus of control is studied in reference to quitting smoking or weight loss. In the realm of conservation and the environment, locus of control could explain why some people are less likely to act in an environmentally-responsible way. As mentioned earlier, someone with an external locus of control may feel they have little control over their lives and many things are determined by external circumstances. Therefore, persons with an external locus of control tend to believe that their efforts to save the environment

cannot make a significant impact on issues of global proportions (McCarty & Shrum, 2001; Kollmuss & Agyeman, 2002; Newhouse, 1991).

Allen and Ferrand (1999) assessed the importance of "personal control" or locus of control in predicting environmentally friendly behavior. The questionnaire focused on four predictors including social desirability, personal control, self-esteem, and belonging. Personal control was a strong predictor of environmentally friendly behavior. In this study, the measure of personal control used by the researchers focused on "individuals' feelings that they could contribute to solving environmental problems" (Allen & Ferrand, 1999, p.349).

Other studies have shown that internal locus of control is positively correlated with environmentally-responsible behavior. Smith-Sebasto and D'Acosta (1995) developed the Environmental Action Internal Control Index (EAICI). A preliminary study showed that EAICI successfully used specific environmental actions to predict self-reported environmentally-responsible behavior in college students based on locus of control (Smith-Sebasto & D'Acosta, 1995). The EAICI can be used to help environmental educators assess whether their programs promote an internal locus of control or increase internal locus of control in their program participants.

In 2000, Hwang, Kim and Jeng surveyed visitors to an urban forest trail in Korea to test the causal relationships between knowledge of environmental issues, locus of control, personal responsibility, attitude, and intention to act in an environmentally-responsible manner. Internal locus of control was assumed to have an affect on an individual's positive attitude level and attitude does affect an individual's intention to act.

Results documented that internal locus of control was the core variable in improving an individual's intention to act in an environmentally-responsible way.

Motivation

Because free-choice learning environments such as zoos and museums allow visitors to choose what educational information is important to them, it is critical for these institutions to understand the motivations that shape the visitor's experience. As mentioned earlier, most visitors do not attend zoos for the educational possibilities (Morgan & Hodgkinson, 1999), but rather to enjoy the novel environment and have fun with family and friends. Other informal learning venues such as museums and art galleries may attract a higher percentage of knowledge-seeking guests. However, learning is still a motivation for some zoo and aquarium visitors (Packer & Ballantyne, 2002).

In 2006, Falk used interviews and entry motivation data to group museum visitors by identity-related motivations. Five clusters of motivations were identified and many visitors reported a combination of motivations. The five main identity-related motivation categories that emerged were the explorer, the facilitator, the professional/hobbyist, the experience seeker, and the spiritual pilgrim. The explorer visits to satisfy his or her own curiosity and desire to learn. The facilitator visits to satisfy the needs of others. The professional/hobbyist visits to fulfill a specific interest or increase knowledge of a related area. The experience seeker, usually from outside the area, visits to have the experience of visiting a specific venue. The spiritual pilgrim visits for reflective purposes, usually to get away from the hustle and bustle of everyday life. The questions used to categorize

museum visitors were then altered to measure visitor motivations at zoos and aquariums (Falk, Reinhard, Vernon, Bronnenkant, Deans, & Heimlich, 2007). Approximately 55 percent of visitors sampled entered the zoo or aquarium with a single, dominant, identity-related motivation. The most common typologies were explorers and facilitators although all five typologies were represented. The remaining percentage of visitors was categorized as some combination of the five identity-related motivations. The small group of experience seekers, approximately seven percent, was the only definable group that showed significant gains on both cognitive and affective measures (Falk, Heimlich & Bronnenkant, 2008).

Previous Life Experiences

The events and experiences that happen throughout an individual's life mold and shape the person they become. Therefore, the more time one spends involved in a specific activity or engaged in a subject, the more effect that experience will have on one's development and interests. This concept holds true for environmental concern as well. People that have had many outdoor experiences in early-life tend to have a more positive perception of the natural environment (Bixler, Floyd & Hammitt, 2002). Also, many of those involved in conservation–related work reported having had extensive outdoor experiences that influenced their career decision (Chawla, 1998). Unfortunately, over the years, fewer people are engaging directly with nature and the outdoors (Louv, 2005). Environmental education has become increasingly important because it links many urban populations that do not have opportunities to become involved with nature allowing them

to experience the outdoors for the first and many times. Through early childhood outdoor experiences, individuals form beliefs and attitudes toward the environment. Although outdoor education or recreation programs can modify or reinforce environmental beliefs, many individuals often arrive with pre-existing beliefs and attitudes formed from prior experience that will not be altered through a single program (Ewert, Place & Sibthorp, 2005).

The importance of childhood outdoor experiences is relevant to zoos as well. For example, adults who had frequently visited the zoo with their families as children were not only more likely to visit the zoo as adults but also focused on the educational benefits more than occasional or infrequent visitors (Holzer & Scott, 1997). Adults who had visited as children also showed a higher attachment and commitment to the zoo. Therefore, early-life trips to the zoo can result in interest consistent with a zoo's mission and possibly foster more environmental concern.

Knowledge

Knowledge is conceptually formed through past learning and other life experiences. Learning is a lifelong process occurring in a variety of situations. New knowledge, whether gained through direct learning situations or picked up through daily endeavors, is cognitively stored for future retrieval (Ausubel, 2000). The combination of past knowledge and experience also influence one's ability to learn and retain information in informal learning settings. This knowledge can be used to determine one's interests and what specific information is deemed meaningful (Falk, 2005). Meaningful

or relevant information is retained at a higher rate than facts and anecdotes that are not inherently intriguing. In the realm of environmental and conservation education, there are a variety of past experiences and previous knowledge that establish what details will be taken away.

In 2003, Falk and Adelman surveyed aquarium visitors to understand the effects of previous objective knowledge and interest on visitor learning. Visitors were surveyed upon entry into the aquarium to collect baseline information about visitors' awareness and understanding of conservation as a concept, their conservation-related knowledge, concerns, and interests, and their perceptions of their relationship to conservation issues. Exit interviews were conducted to determine the impacts of their aquarium visit. Visitors with moderate to extensive interest and least and most knowledge showed significant changes in their conservation knowledge. Individuals with minimal to moderate interest showed gains in conservation interest and concern. By segmenting visitors into groups based on prior knowledge and interest, free-choice learning centers can develop education materials focused for each group.

In some cases, environmental education programs may not be presenting new conservation information, but the repetition of familiar concepts reinforce previous knowledge, attitudes and behavior. Affirmation is a necessary part of the learning experience allowing individuals to strengthen pre-existing beliefs (Storksdierck, Ellenbogen & Heimlich, 2005). A recent study by AZA found that many visitors enter zoos and aquariums with a higher-than-expected knowledge of environmental concepts. Therefore, many conservation messages reinforce attitudes and beliefs and encourage

visitors to continue or increase environmentally-responsible behavior (Falk, Reinhard, Vernon, Bronnenkant, Deans, & Heimlich, 2007).

Differentiation should be made between perceived knowledge and objective knowledge. Perceived knowledge or subjective knowledge refers to what or how much an individual thinks they know about a topic. Objective knowledge is the amount of accurately stored information an individual can retrieve when asked. Consumer research has determined that perceived knowledge can influence decision-making for consumer choices (Moorman, Diehl, Brinberg, & Kidwell, 2004). Depending on the subject matter in question, some studies show varying correlations between perceived knowledge and objective knowledge (Radecki & Jaccard, 1995; Moorman, Diehl, Brinberg, & Kidwell, 2004). No research has explored the differences of perceived and objective knowledge in free-choice learning settings such as and the effects on environmentally-responsible behavior.

KAAB

Over the last decade, zoos and aquariums have placed more emphasis on creating opportunities to influence the conservation-related knowledge, attitudes, affect and behavior (KAAB) of their visitors (Groff, Lockhart, Ogden & Dierking, 2005). By understanding the knowledge, interests and attitudes of its visitors, zoo education departments can design program elements to reach diverse audiences (Negra & Manning, 1997). Previous research has focused on explaining the impact KAAB had on a visitor's learning and retention (Falk & Adelman, 2003; Falk, Reinhard, Vernon, Bronnenkant,

Deans, & Heimlich, 2007). Results showed that learning was not evenly distributed across all visitors, but general predictions about learning can be made through understanding the elements of each visitor's KAAB.

Knowledge and attitudes can affect how much a visitor retains when visiting a free-choice learning environment. When visiting a zoo or aquarium, conservation-mindedness can predict how visitors remember, react to or act upon conservation-related material (Yalowitz, 2004). The degree of knowledge and attitudes toward an environmental topic can affect the amount of time spent observing and interacting in a conservation-themed exhibition. If visitors have no knowledge of or interest in the topic or find that their attitudes and beliefs are not in line with the theme of the exhibit, they may not spend much time viewing the display.

Research shows that wildlife encounters have an impact on conservation attitudes and behavior. Zoos and aquariums can connect visitors through wildlife encounters such as observing animals in their 'natural' habitat, up-close or behind-the-scenes encounters, connecting with visitors' previous knowledge and experiences, and providing conservation actions that promote behavior change (Ballantyne, Packer, Hughes & Dierking, 2007). Although zoos and aquariums are captive environments, wildlife encounters can be facilitated in various ways to connect with visitors on an emotional level. These experiences can affect attitudes and possibly conservation-related behavior.

In 2004, Kruse and Card studied a conservation education camp program at an AZA-accredited facility. They evaluated the effects of four levels of zoo camp programs on the self-reported knowledge, attitudes and behavior of its participants. Each

participant entered the program with varied amount of previous knowledge and experience about animals and husbandry. Initial self-ratings revealed that campers who had previously attended zoo camp exhibited higher perceived knowledge and attitudes, but behavior was not significantly different from other campers.

Many environmental education practitioners believe that it is their mission to inform the general public. By raising environmental awareness, proactive environmental behavior should closely follow. Many times this is not the case. Research has shown that a person's level of environmental awareness and concern does not directly predict environmentally-responsible behavior (Bamberg, 2003; Kollmuss & Agyeman, 2002; Hungerford & Volk, 1993).

Environmentally-Responsible Behavior

Recent research in environmental psychology has focused on understanding pro-environmental behavior, or environmentally-responsible behavior (ERB). Environmentally-responsible behavior can range from simple actions such as recycling at home to more complex initiatives like becoming an environmental activist within your community or state. Researchers investigate various factors including demographics, motivations, values, place attachment, and availability and difficulty of participating in ERB (Schultz & Zelenzny, 1999; Vaske & Kobrin, 2001; Kaiser, Doka, Hofstetter, & Ranney, 2003). Many of these studies use Ajzen's Theory of Planned Behavior (1991) to predict behavioral outcomes of projects such as neighborhood recycling programs, energy conservation incentives and alternative means of transportation. Although many

research participants report concern for environmental issues, environmental concern does not necessarily result in ERB (Bamberg, 2003). Personal and cultural norms also play a role in decision-making regarding ERB (Bamberg & Moser, 2007; Thogersen, 2006).

Environmentally-responsible behavior can be promoted through encounters with nature, sustainable tourism, school field trips, and issues exhibitions in free-choice settings. By arousing emotion, challenging beliefs and enhancing environmental conception, these institutions encourage visitors to take action (Ballantyne & Packer, 2005). Many zoos and aquariums use educational signage or programming to encourage ERB. Although some visitors leave with good intentions, concern for environmental issues may dwindle when visitors return home feeling helpless with no sense of any direct action they can take.

By giving visitors a chance to take action on-site, the participation rates for the suggested actions were higher. Swanagan (2000) found that a majority of zoo visitors who had experienced an interactive elephant demonstration and bio-fact program would support elephant conservation when given a chance to act on-site. Visitors were asked to fill out a survey, sign a petition to continue the ban on illegal trade of ivory and fill out a conservation-action solicitation card to be sent to the White House via the zoo. By pairing an interactive educational program with specific on-site conservation behaviors and providing a means to act immediately, participation in these behaviors was greatly increased.

Zoo visitors who viewed a newly implemented exhibit about the bushmeat crisis were asked to voice their concerns on a card to be forwarded to state legislatures. Visitors that took the card home were less likely to return it than those that took action before leaving the zoo (Stoinski, Allen, Bloomsmith, Forthman, & Maple, 2002). Although some visitors have intentions of behavior change, the initial increase does not persist over time. The intended involvement in conservation-related activities generally returns to baseline levels two to three months after the visit (Dierking, Adelman, Ogden, Lehnhardt, Miller, & Mellen, 2004).

Summary

Education staff in free-choice learning environments spend time and money developing educational elements with their visitors' needs in mind. By understanding the different characteristics that visitors bring with them to the zoo, the staff can plan programs to reach the largest number of people. Educators increase relevance of their efforts to connect people through learning styles, previous experiences, personal interests or pre-existing knowledge and attitudes. Variables such as locus of control and motivation should be taken into account when evaluating the success of the program because they can influence the visitor's retention and behavior. Each characteristic can affect an individual's decision to engage in an educational program and ultimately determine the success of the program.

Clearly, the era of black box evaluations of free-choice learning environments is over. The first generation of evaluations sought to demonstrate effectiveness of programs

without understanding mediating variables. The current model involves trying to understand for whom and in what context a particular type of program is effective (Pawson & Tilley, 1997). This study explores the role of locus of control, motivation, previous life experiences, personal interest and knowledge on the effectiveness of a zoo program designed to stimulate environmentally-responsible behavior.

CHAPTER THREE
METHODS

The purpose of this study is to explore the role of locus of control, motivation, previous life experiences, personal interest and knowledge on the effectiveness of a zoo program designed to stimulate environmentally-responsible behavior. This chapter discusses the study population, data collection instrument, procedures and data analysis.

Study Population

The study was conducted at a large Midwestern zoo exhibiting 3000 animals on 160+ acres. During the summer, the zoo may admit up to 14,000 visitors on a busy day. Most weekends have larger visitation numbers and every Monday free admission to the zoo is offered to residents of the tax district.

Description of the Program

The education department implemented a new theatrical animal show focusing on conservation of natural resources and emphasizing the importance of humans acting responsibly toward the environment and wildlife. Audience members were informed through the theater presentation that their environmentally-responsible behaviors are the "key," and action must be taken to ensure a future for wildlife. The theme of action appeared again in two other temporary exhibits, a touch pool exhibit and an animatronic dinosaur display both of which required a fee in addition to regular zoo admission. A

symbol of a key was placed on signs containing messages about being environmentally responsible throughout the other two exhibits. These messages informed visitors about environmentally-responsible actions that they could take after leaving the zoo. Actions items included conservation of fossil fuels, purchasing sustainable wood products, using biodegradable soap, purchasing sustainable seafood, using environmentally-friendly lawn and garden products, using lead-alternative in hunting and fishing, and water conservation.

Data Collection

Before data collection began, the Clemson University Institutional Review Board approved all study procedures. Three research technicians from Clemson directed the study with the help of 42 zoo volunteers and docents. The volunteers were trained prior to data collection to establish reliable data collection procedures. During zoo hours, academic researchers and volunteers roamed between the three evaluation sites or the entrance/exit of the zoo to collect data. Clemson research technicians made spot checks of Zoo volunteers for fidelity of implementation through observation and asking volunteers whether they understood procedures and inspecting their initial work after they had implemented research protocols. After observing the program and its elements, researchers made necessary changes to the evaluation tools to decrease error and misunderstanding among volunteer research technicians. Visitor intercept procedures were tested and refined to include location and timing of intercepts and the content of persuasive appeals to increase participation rates in the study.

Data collection took place over a seven day period in July 2007. Average zoo attendance numbers are larger during the summer while children are out of school. Weather conditions were favorable due to comfortable temperatures and light breezes. Rain was only an issue on the last day of data collection which was also the middle of the week when attendance levels were lowest.

A mixed-method survey strategy (Web-based and regular mail) was chosen to collect data. Web-based surveying was the primary method of data collection due to the faster turnaround time and cost savings associated with eliminating the printing and mailing of surveys (Cobanoglu, Warae & Morec, 2001; Parson, 2007). Paper surveys were utilized for visitors without email access.

Email addresses were collected by the research technicians through intercepts at the main Zoo entrance/exit gate, near the Rainforest entrance outside the main Zoo, at the amphitheater where the theatrical show was held, the touch tank and the animatronic dinosaur display. Because the study focused on the effects of the newly implemented education program, the sampling scheme emphasized selecting visitors who had attended the relevant exhibits by sampling at these three attractions. Of the respondents, 82% had visited at least one of the three special exhibits.

Visitors were intercepted and asked if they would be willing to complete an online questionnaire about their visit to the zoo and the new education programs implemented over the summer. If a visitor did not have an email address, a home address was accepted to mail a self-report survey. To ensure a sufficient response rate, a goal of a

minimum of 1,200 addresses was set. Quotas for acquiring adequate numbers of emails/addresses were evaluated daily to assess efficiency.

At the completion of the study period, a total of 1345 email addresses had been collected. Email surveys were sent out approximately two months after the visit date. Initially, 166 emails were returned either because they were invalid or the email address contained a typographic error. It is assumed that all other participants received the original survey link, but it is possible that email providers did not return undeliverable emails, the email was caught by spam filters, or that some potential respondents did not check their email accounts or had abandoned their account. The returned emails were checked for typing errors or misinterpretation of the visitor's handwriting. Changes were made and several new "first" emails were sent to the modified email address. Approximately nine participants opted out of the survey upon receiving the request to complete the questionnaire. These participants did not receive any additional emails. After removing invalid emails and respondents that had opted out, there were 1198 possible web-based survey respondents. A reminder email was sent four days after the first survey link invitation was received (Parsons, 2007). A second reminder email was sent five days after the first reminder. Due to a concern that some people's email account might send the survey link directly to a spam folder, another set of reminder emails were sent to visitors that had not responded from the researcher's university webmail address rather than the web survey company's system about three weeks after the initial mailing. A final reminder and thank you email was sent approximately one month from the first email. The text of the email thanked everyone for their participation and informed them

that the survey link would be open for about one more week if anyone had not already filled out the online survey. The final count of completed surveys was 486 out of a possible 1198 for a 41% response rate.

Any visitors without an email address received a paper survey with a self-addressed, business-reply envelope for easy return. The first mailing was sent to 139 visitors who provided a mailing address. Using a modified Dillman method (2000), a reminder postcard was mailed two weeks after the original survey to participants who had not responded. A second reminder with a replacement survey was sent four weeks after the initial survey. Six weeks after the initial mail out, a final reminder postcard was sent to any participants who had not responded. After the final reminder, 62 paper surveys were returned although two surveys had not been completed. The final count was 60 returned surveys for a 43% response rate.

Demographic characteristics were collected for respondents including gender, age, education, race/ethnicity and income. Because sampling was done to maximize the number of respondents who went to the three areas of the Zoo where conservation messages were delivered, these demographics are not necessarily representative of the entire population of zoo visitors. The majority of respondents were female (80%) and predominantly white (95%). Over 60% of respondents were between 30 – 49 years of age

(See Table 2). Over half of respondents had a college degree or higher (See Table 3). A majority of respondents reported a yearly household income of $70,000 or less (See Table 4). Almost 80% of respondents reported having one or more children age 11 or younger present with the group during the zoo visit (See Table 6).

Table 1: Gender

Gender	Frequency	Percentage
Male	89	20.1
Female	353	79.9

Table 2: Age

Age	Frequency	Percent
18 – 29	72	16.3
30 – 39	177	40.0
40 – 49	110	24.9
50 – 64	66	15.0
65 or over	17	3.8

Table 3: Education

Education	Frequency	Percentage
Some high school	12	2.7
High school graduate	51	11.5
Some college	101	22.9
Associate/technical degree	52	11.8
College graduate	128	29.0
Some graduate school	25	5.7
Masters degree	61	13.8
Ph. D.	12	2.7

Table 4: Income

Income	Frequency	Percentage
Less than $30,000	64	15.6
$30,000 to $69,000	180	43.8
$70,000 or more	167	40.6

Table 5: Race/ ethinicity

Race/ethnicity	Frequency	Percentage
White	411	94.7
Black or African American	11	2.5
Hispanic or Latino	6	1.4
Asian	5	1.2
American Indian or Native American	1	0.2

Table 6: Number of groups of respondents with children present during zoo visit

Children	Frequency	Percentage
Younger than 4	240	44.0
Age 4 – 7	275	50.4
Age 8 – 11	199	36.4
Total number of groups with children present	428	78.4

Data Collection Instrument

The survey included general questions about the visitor's trip to the zoo and questions regarding the newly implemented educational program and its components. General questions focused on overall satisfaction, group size and composition, previous zoo visits, and exhibits visited. A locus of control scale was developed to determine whether the visitor exhibits an internal or external locus of control. The locus of control scale was modified from the original 29 questions in a forced-choice format (Rotter, 1966). General categories such as politics, personal responsibility, actions of others, and

education and interest were derived from the original scale and modified in relation to wildlife and the environment. Participants answered each of ten questions on a four-point scale with categories ranging from strongly disagree to strongly agree. A neutral option was not given to retain the element of forced-choice from Rotter's original scale.

Questions regarding visit motivation were used to establish the visitor's motivations for coming to the zoo. An experience-use-history index and various other early-life experience questions were used to explain effects of early-life experiences on ERB. Personal interest and perceived knowledge questions related animals and the environment and an objective knowledge test were designed by the researcher to explore interest and knowledge related to environmentally-responsible behavior. To evaluate ERB, zoo education staff compiled and provided the researcher a list of environmentally-responsible actions presented throughout the zoo. The list was reduced to 21 actions or categories of actions that encompassed all the listed conservation actions that could have been experienced by visitors while at the zoo.

Data analysis

Data collected through the Web-based survey site were downloaded into an SPSS spreadsheet. The paper surveys were entered into the same spreadsheet manually. Although only 82% of respondents had attended one or more of the summer education program exhibits, all respondents were included in data analysis for a better understanding of the general zoo visitor. Exploratory factor analysis was used to identify composite variables for locus of control, environmentally-responsible behavior,

motivation, educational value of the theatrical animal show, the touch tank and the animatronic dinosaur display, self-perceived interest in animal and conservation-related topics and perceived knowledge on the same set of topics. To identify significant relationships, pearson product-moment correlations were calculated between the independent variables and the dependent variable of environmentally-responsible behavior.

H_1 – Visitors determined to have an internal locus of control will be more likely to continue, increase or start environmentally-responsible behavior than visitors determined to have an external locus of control. A factor analysis was run to verify that variables on the locus of control scale were internal and external indicators. The internal locus of control variable consisted of the following statements: More education will help save wildlife species, voting for politicians concerned with environmental issues can help save wildlife, the future of wildlife is partially up to me, wildlife becoming rare are due to us not taking enough interest in them, and voting in elections can help protect wildlife. Cronbach's alpha for internal locus of control was 0.78. The external locus of control variable included the following statements: Wildlife species are going to become extinct no matter what I do, no matter how hard we try to save endangered wildlife, many species are going to become extinct anyway, there is not much the common person can do to save endangered species, and I can do little about the selfish people who threaten the existence of wildlife species. Cronbach's alpha for external locus of control was 0.68. The environmentally-responsible behavior (ERB) measure was calculated in three ways.

Behavior 3 consisted of a summated score for behavior started, increased or continued after the zoo visit. If a person reported any of the three levels of behavior for any of the ERB topics, they were assigned one point for each behavior. Behavior 2 consisted of a summated score for behavior started or increased after the zoo visit. If a person reported starting or increasing any of the ERB behaviors, they were assigned one point for each behavior. Behavior 1 included only behavior started after the zoo visit. If a person reported starting an ERB behavior, they were assigned one point for each behavior. Correlation was run to evaluate the differences between internal and external locus of control on each of the three versions of the ERB measures.

H_2 – Visitors with an educational motivation-related identity will be more likely to continue, increase or start environmentally-responsible behavior than visitors with other motivation-related identities. Correlations were run to assess the relationship between eight visit motivation variables and the three versions of ERB.

H_3 – Visitors with previous life experiences involving animals or the outdoors will be more likely to continue, increase or start environmentally-responsible behavior than visitors with little or no previous experiences involving animals or the outdoors. An experience-use-history was used to find out what other attractions visitors attended within the last three years. Correlations were run to look at correlations between attendance at specific attractions and ERB. A composite variable was formed based on a sum of educational attractions that were visited. This variable was comprised of natural history

museum, national parks, state parks, science museum, aquarium, botanical garden, children's museum, and nature center. The number of educational attractions that were visited was correlated with the three versions of ERB. Correlations were run to identify relationships between owning a pet as a child and ERB. Each type of pet was evaluated individually and then a composite variable for the total number of different types of pets owned was calculated based on a sum of pets owned during childhood. A correlation assessed whether owning more types of pets was related to ERB. Correlations were also run with other variables designated as previous life experiences involving animals and the outdoors. These variables included pets in classrooms, involvement in Boy Scouts, Girl Scouts, Brownies, Weeblos, Cub Scouts, etc., attending various summer camp settings, experience with a teacher before high school that put emphasis on wildlife or environmental issues number of zoo visits before the age of 14 with family, or number of zoo visits before the age of 14 with school group. The age of 14 was chosen to include experiences before adolescence during elementary and junior high school. Each of these variables was correlated with the three versions of ERB.

H_4 – Visitors with personal interest in environmental and conservation issues will be more likely to continue, increase or start environmentally-responsible behavior than visitors with little personal interest in environmental and conservation issues. A list of eight variables related to animals and conservation were used to evaluate the visitor's inherent interest in the zoo and its mission. Each variable was correlated with the three versions of ERB. Exploratory factor analysis was used to group variables into a

composite conservation interest variable and a hedonistic interest variable. The conservation interest variable included wildlife conservation, animal welfare, illegal pet trade and environmental issues with a Cronbach's alpha of 0.84. The hedonistic interest variable included common pets, exotic pets, funny things animals do, and training animals. Cronbach's alpha was 0.74. These two composite variables were correlated with the three versions of ERB.

H_5 – Visitors with higher perceived knowledge of environmental and conservation issues will be more likely to continue, increase or start environmentally-responsible behavior than visitors with little perceived knowledge of environmental and conservation issues. The same eight variables (common pets, exotic pets, funny animal tricks, training animals, wildlife conservation, animal welfare, illegal pet trade, and environmental issues) were also used to assess the visitors' perceived knowledge of the topics. Each perceived knowledge variable was correlated with the three levels of ERB. Composite variables were formed for conservation knowledge (wildlife conservation, animal welfare, illegal pet trade, and environmental issues) and hedonistic knowledge (common pets, exotic pets, funny animal tricks, and training animals). Each composite variable was correlated with the three versions of ERB.

H_6 – **V**isitors who scored higher on the objective knowledge test will be more likely to continue, increase or start environmentally-responsible behavior than visitors that scored lower on the objective knowledge test. A twelve question knowledge test was used to

assess general animal and environmental knowledge. Participants received one point for each question answered correctly. No points were given for questions answered incorrectly or when participants responded with 'not sure.' Knowledge test scores were correlated with each perceived knowledge variable and the two composite variables. Then the knowledge test score was correlated with the three versions of ERB.

H_7 – Visitors attending two or all three components of the educational program will be more likely to start or increase environmentally-responsible behavior than visitors attending less than two components of the educational program. Each of the three special exhibits and all combinations of attendance at any or all of the three exhibits were correlated with the three versions of ERB. These included Dinosaurs; Touch; Dr. Zoolittle; Dinosaurs and Touch; Dinosaurs and Dr. Zoolittle; Touch and Dr. Zoolittle; and Dinosaurs, Touch and Dr. Zoolittle. Each of the combinations was correlated with the 21 action behaviors to determine if attendance at specific exhibits encouraged specific action behaviors.

CHAPTER FOUR
RESULTS

A large Midwestern zoo implemented a summer education program to encourage environmental action through a series of action messages with an associated icon on signs in two special exhibits along with an interpretive theatrical show that delivered a similar message. A survey was administered two months after a July zoo visit to evaluate the success of the program in terms of stimulating environmentally-responsible behavior. Participants' locus of control, visit motivation, previous life experiences, personal interest and knowledge were evaluated in relation to environmentally-responsible behavior. A total of 546 web-based and paper mail-back surveys were completed by zoo visitors. The majority of respondents were female (80%) and predominantly white (95%).

Locus of Control

H_1 – Visitors determined to have an internal locus of control will be more likely to continue, increase or start environmentally-responsible behavior than visitors determined to have an external locus of control.

The correlation between respondents with an internal locus of control and environmentally- responsible behavior that was started, increased or continued was r =.13 (*n=313, p = .02*). The correlation between external locus of control and environmentally-responsible behavior that was continued, increased or started was non-significant (See Table 7). Then correlations were run to assess the relationship between locus of control

and the 21 environmentally-responsible behaviors. Only the behaviors with significant correlations with internal or external locus of control were reported in Table 8.

Table 7: Correlation between locus of control and environmentally-responsible behavior

	Behavior 3[1]	Behavior 2	Behavior 1
Internal Locus of Control	.13*	---	---
External Locus of Control	---	---	---

*Statistically significant ($p<.05$)

Table 8: Correlation between locus of control and specific ERB

	Internal LOC	External LOC
Donate to environmental cause	.14*	-.12*
Volunteer for environmental org.	.13*	---
Car pool/mass transit	---	.11*
Seafood Watch card	.17*	-.11*
Learn on internet or books	.13*	---
Visit environmental org. website	.12*	---
Support environmental legislation	.17*	---

*Statistically significant ($p<.05$)

Motivation

H_2 – Visitors with an educational motivation-related identity will be more likely to continue, increase or start environmentally-responsible behavior than visitors with other motivation-related identities.

Correlations were run to determine significant relationships between visit motivations and environmentally-responsible behavior (See Table 9). Visitors attending

[1] The environmentally-responsible behavior (ERB) was calculated in three ways. Behavior 3 consisted of a summated score for behavior started, increased or continued after the zoo visit. Behavior 2 is consisted of a summated score for behavior started or increased after the zoo visit and Behavior 1 included only behavior started after the zoo visit.

the zoo with a wildlife conservation motivation had the highest correlations with environmentally-responsible behavior. The correlation for Behavior 3 was r = .32 (*n=356, p < .001*), Behavior 2 was r = .26 (*n = 356, p < .001*) and Behavior 1 was r = .17 (*n = 356, p = .001*).The motivation for getting out of the house had a significant negative correlation with Behavior 3 with r = -.10 (*n = 356, p = .05*).

Table 9: Correlation between visit motivation and environmentally-responsible behavior

	Behavior 3	Behavior 2	Behavior 1
Be with friends/family	---	.15*	.14*
Kid's Reaction	---	.12*	---
Learn about animals	.25**	.21**	.14*
Wildlife conservation	.32**	.26**	.17*
Fun	.12*	.16*	.14*
Special Events/Exhibits	.15*	.19**	.16*
Hustle and bustle	---	.11*	.15*
Get out of the house	-.10*	---	---

*Statistically significant (p<.05)
**Statistically significant (p<.001)

Previous Life Experiences

H_3 – Visitors with previous life experiences involving animals or the outdoors will be more likely to continue, increase or start environmentally-responsible behavior than visitors with less previous life experiences involving animals or the outdoors.

Correlations were run to assess whether various previous life experiences were related to environmentally-responsible behavior. Attractions from an experience-use-history were correlated with environmentally-responsible behavior (See Table 10). The composite variable for educational attractions was significantly correlated with Behavior 3 with r = .30 (*n = 358, p < .001*).

Table 10: Correlation between attendance at local attractions and environmentally-responsible behavior

	Behavior 3	Behavior 2	Behavior 1
Natural History Museums	.18**	---	---
National Parks	.19**	---	---
State Parks	.18*	---	---
Science Museums	.13*	---	---
Aquariums	---	-.12*	---
Botanical Gardens	.21**	---	---
Children's Museums	---	---	---
Nature Centers	.28*	---	---
Library	.11*	---	---
Golf Course	---	---	---
High School Sporting Events	---	---	---
College Sporting Events	---	---	---
Professional Sporting Events	---	---	---
Art Museums	.19**	---	---
Popular Music Concerts	---	---	---
Classical Music Concerts	---	---	---
Weekend Festivals	---	---	---
Auto Racing	---	---	---
Amusement/Theme Parks	---	---	---
None of the Above	---	---	---
Composite of Educational Attractions[2]	.30**	---	---

*Statistically significant ($p<.05$)
**Statistically significant ($p<.001$)

[2] Composite of educational attractions includes National History Museums, National Parks, State Parks, Science Museums, Aquariums, Botanical Gardens, Children's Museums and Nature Centers.

Correlations were run to assess the relationship between owning pets and environmentally-responsible behavior (See Table 11). The composite variable for the number of different types of pets owned was significantly correlated with Behavior 3 with r = .25 (*n = 358, p < .001*) and Behavior 2 was r = .16 (*n = 358, p = .002*). Several early-life experiences were correlated with environmentally-responsible behavior. Table 13 shows a significant relationship between visits to the zoo with school groups before the age of 14 and Behavior 2 with r = 12 (*n = 354, p = .025*).

Table 11: Correlation between owning pets and environmentally-responsible behavior

	Behavior 3	Behavior 2	Behavior 1
Dog	.13*	---	---
Cat	.14*	---	---
Ferret	---	---	---
Fish	.18*	.13*	---
Bird	.16*	---	---
Snake	.12*	---	---
Turtle	.17*	---	---
Lizard	---	---	---
Frog	.13*	.12*	---
Salamander	---	---	---
Insect	---	---	---
Spider or tarantula	---	.29**	---
Livestock	.14*	---	---

*Statistically significant (p<.05)
**Statistically significant (p<.001)

Table 12: Correlation between number of types of pets and environmentally-responsible behavior

	Behavior 3	Behavior 2	Behavior 1
Composite of total number of different types of pets owned	.25**	.16**	---

*Statistically significant (p<.05)
**Statistically significant (p<.001)

Table 13: Correlation between early-life experiences and environmentally-responsible behavior

	Behavior 3	Behavior 2	Behavior 1
Visits to the zoo with family	---	---	---
Visits to the zoo with school group	---	.12*	---
Class pet	---	---	---
Summer camp experience	---	---	---
Scouts, Brownies, etc.	---	---	---
Had teacher who focused on environmental issues in Jr High	---	-.17*	---
Had teacher who focused on wildlife in Jr High	-.22*	-.20**	---

*Statistically significant (p<.05)
**Statistically significant (p<.001)

Personal Interest

H_4 – Visitors with personal interest in environmental and conservation issues will be more likely to continue, increase or start environmentally-responsible behavior than visitors with little personal interest in environmental and conservation issues.

Correlations were run to determine the relationship between personal interest in animal and environmental topics and environmentally-responsible behavior (See Table 14). Significant relationships were found for the conservation variables and Behavior 3: wildlife conservation r = .37 ($n = 352, p < .001$), animal welfare r = .18 ($n=349, p = .001$), illegal pet trade r = .28 ($n = 350, p < .001$), and environmental issues r = .39 ($n = 349, p < .001$). The composite variable for conservation interest was significantly correlated with Behavior 3 with r = .37 ($n = 342, p < .001$).

Table 14: Correlation between personal interest and environmentally-responsible behavior

	Behavior 3	Behavior 2	Behavior 1
Common pets	---	---	---
Exotic pets	---	.18*	---
Funny animal tricks	---	.17*	---
Training animals	---	.14*	---
Wildlife conservation	.37**	.14*	---
Animal welfare	.18*	---	---
Illegal pet trade	.28**	---	---
Environmental issues	.39**	.14*	---
Hedonistic interest[3]	---	.16**	---
Conservation interest[4]	.37**	.14*	---

*Statistically significant (p<.05)
**Statistically significant (p<.001)

Knowledge

H_5 – Visitors with perceived knowledge of environmental and conservation issues will be more likely to continue, increase or start environmentally-responsible behavior than visitors with little previous knowledge of environmental and conservation issues.

Correlations were run to determine the relationship between level of perceived knowledge of animal and environmental topics and environmentally-responsible behavior (See Table 15). Significant relationships were found for Behavior 3 with all variables although the conservation variables exhibited higher significant correlations. Both the composite variable for hedonistic knowledge and conservation knowledge were significantly correlated with Behavior 3 with $r = .30$ ($n = 351$, $p < .001$) and $r = .49$ ($n=350$, $p < .001$) respectively.

[3] Hedonistic interest is a composite variable composed of common pets, exotic pets, funny animal tricks and training animals.

[4] Conservation interest is a composite variable composed of wildlife conservation, animal welfare, illegal pet trade and environmental issues.

Table 15: Correlation between perceived knowledge and environmentally-responsible behavior

	Behavior 3	Behavior 2	Behavior 1
Common pets	.23**	.12*	---
Exotic pets	.23**	.13*	---
Funny animal tricks	.15*	.11*	---
Training animals	.28**	---	---
Wildlife conservation	.45**	.12*	---
Animal welfare	.34**	---	---
Illegal pet trade	.39**	---	---
Environmental issues	.41**	.11*	---
Hedonistic knowledge[5]	.30**	.16*	---
Conservation knowledge[6]	.49**	---	---

*Statistically significant (p<.05)
**Statistically significant (p<.001)

H_6 – Visitors who scored higher on the objective knowledge test will be more likely to continue, increase or start environmentally-responsible behavior than visitors that scored lower on the objective knowledge test.

To better assess the relationship between perceived knowledge and objective knowledge of animal and environmental issues, correlations were run between the perceived knowledge variables and the objective knowledge test score. Visitors that perceived to have higher knowledge about conservation issues also had higher scores on the objective knowledge test (See Table 16). Then correlations were run to determine the relationship between the objective knowledge test score and environmentally-responsible behavior (See Table 17). There was a significant relationship between visitors that scored well on the objective knowledge test and Behavior 3 with r = .21 ($n = 336, p < .001$).

[5] Hedonistic knowledge is a composite variable composed of common pets, exotic pets, funny animal tricks and training animals.

[6] Conservation interest is a composite variable composed of wildlife conservation, animal welfare, illegal pet trade and environmental issues.

Table 16: Correlation between perceived knowledge and objective knowledge test score

Perceived Knowledge	Objective Knowledge Test Score
Common pets	**.10***
Exotic pets	**.15****
Funny animal tricks	**.12***
Training animals	**---**
Wildlife conservation	**.22****
Animal welfare	**.18****
Illegal pet trade	**.21****
Environmental issues	**.26****
Hedonistic knowledge	**.13****
Conservation knowledge	**.27****

*Statistically significant ($p<.05$)
**Statistically significant ($p<.001$)

Table 17: Correlation between objective knowledge test score and environmentally-responsible behavior

	Behavior 3	Behavior 2	Behavior 1
Objective knowledge test score	**.21****	**---**	**-.15***

*Statistically significant ($p<.05$)
**Statistically significant ($p<.001$)

Attendance at Special Exhibits

H_7 – Visitors attending all three components of the educational program will be more likely to start or increase environmentally-responsible behavior than visitors attending less than three components of the educational program.

Correlations were run to evaluate the relationship between attendance at the three educational exhibits and environmentally-responsible behavior (See Table 18). The exhibits were run individually and with each possible combination of the three exhibits.

There was a significant relationship between visiting all three exhibits and Behavior 3 with r = .13 (*n = 358, p = .01*). Then correlations were run to assess the relationship between attendance at the three special exhibits and the 21 environmentally-responsible behaviors (See Table 19).

Table 18: Correlation between at all combinations of special exhibits and environmentally-responsible behavior

	Behavior 3	Behavior 2	Behavior 1
Dinosaurs	.11*	---	.12*
Touch	---	---	---
Dr. Zoolittle	---	---	---
Dr. Z, Touch	---	---	---
Dino, Touch	.11*	---	---
Dr. Z, Dino	.13*	---	.11*
All three exhibits	.13*	---	---

*Statistically significant (p<.05)

Table 19: Correlation between all combinations of special exhibits and specific ERB[7]

	Dinosaurs	Touch	Dr. Zoolittle	Dr. Z, Touch	Dino, Touch	Dr. Z, Dino	All three
Donate to env. cause	---	---	---	----	---	.10*	
Create backyard habitat	.10*	---	.11*	---	---	.15*	---
Clean up pollution	---	---	.11*	---	---	---	---
Environmentally safe soap/ detergent	.11*	---	.12*	.15*	.12*	.17*	.17**
Learn on internet or books	.10*	.12*	---	.11*	.14*	---	.14*
Watch wildlife TV	---	.11*	---	---	---	---	---
Visit environmental organization website	.10*	.12*	---	.14*	.14*	.12*	.16*
Protect habitat for local wildlife	---	---	.14*	---	---	---	---

*Statistically significant (p<.05)
**Statistically significant (p<.001)

[7] Although each of the 21 specific behaviors was correlated with each version of ERB, only the behaviors with a significant correlation are represented in the table.

CHAPTER FIVE
DISCUSSION

Summary of Study

The purpose of this study is to explore the role of locus of control, motivation, previous life experiences, personal interest and knowledge on the effectiveness of a zoo program designed to stimulate environmentally-responsible behavior. Two temporary summer exhibits and an interpretive theatrical show were developed to encourage zoo visitors to take responsible environmental action after leaving the zoo. A survey was administered to determine whether visitors started, increased, or continued 21 environmentally-responsible behaviors mentioned throughout the zoo. Other questions were developed to determine whether locus of control, visit motivation, previous life experiences, personal interest, or knowledge influence the level of participation in environmentally-responsible behavior. Results indicated that locus of control, educational motivation, previous life experiences, personal interest and knowledge are significant factors in influencing environmentally-responsible behavior.

Discussion of Results

Study results confirm that internal locus of control can influence of environmentally-responsible behavior. Analysis indicated a significant positive relationship between visitors with an internal locus of control and continuing, increasing or starting environmentally-responsible behavior. Specific ERBs significantly and

positively correlated with internal locus of control include donating to an environmental cause, volunteering for an environmental organization, using the Seafood Watch cards, learning about animals or the environment on the internet or through books, visiting an environmental organization's website or supporting environmental legislation. Alternately, behaviors with a significant negative correlation to external locus of control included donating to an environmental cause and using the Seafood Watch cards. There is also a significant positive correlation between visitors with an external locus of control and car pooling or the use of mass transit.

People who believe they have a large degree of control over their life are more likely to take action to protect wildlife and the environment. This study reconfirms what Smith-Sebasto & D'Acosta (1995) found about locus of control. It is unclear whether locus of control can be changed within the context of free-choice learning settings, but some authors believe it is possible (Smith-Sebasto & D'Acosta, 1995; Hwang, Kim & Jeng, 2000). As mentioned previously, people with an external locus of control tend to feel that their actions cannot contribute to solving the world's environmental problems (McCarty & Shrum, 2001; Kollmuss & Agyeman, 2002; Newhouse, 1991). Therefore, they are probably not car pooling or using mass transit to act in an environmentally-responsible way but because this could possibly be their only mode of transportation.

Visitors arriving at the zoo with an educational motivation tend to report acting in a more environmentally-responsible way. There was a significant positive correlation between visitors that enjoy visiting the zoo to learn about the animals or for wildlife conservation motivations. Although other motivations showed significant correlations,

wildlife conservation and learning about animals had the most significant positive correlations. Correlations were highest with Behavior 3 and decreased proportionally with Behavior 2 and Behavior 1. Visitors with an educational motivation are seeking out meaningful information about wildlife conservation or the environment. The significant negative correlation with visitors going to the zoo to get out of the house and Behavior 3 shows that visitors just looking for a change of scenery or something novel to do are less likely to begin new environmental behavior. As Packer and Ballantyne (2002) stated, many visitors value the educational opportunities even though education may not be the top priority for visiting the zoo. Learning opportunities should be readily available for visitors arriving with motivations, whether recreational or educational, but especially those wishing to learn.

Study results support the importance of previous life experiences in relation to environmentally-responsible behavior. There was a significant positive correlation between the composite variable for educational attractions and Behavior 3. Visitors that also attend attractions such as natural history museums, national parks, science museums or botanical gardens tend to be more involved in environmentally-responsible behavior. Results also showed that visitors that owned a number of different types of pets were significantly and positively correlated with Behavior 3 and Behavior 2. Visitors with a variety of pets may have increased their knowledge and interest of animals in general and the environments that they live in. Therefore, previous life experiences involving animals or early-life outdoor experiences may foster concern for the environment and wildlife conservation (Bixler, Floyd & Hammitt, 2002; Chawla, 1998). In contrast, results of this

study did not replicate Holzer and Scott's (1997) finding that childhood visits with family increase educational interest in the zoo's mission as an adult.

Visitors with a higher degree of reported personal interest in conservation issues tend to exhibit more environmentally-responsible behaviors. Analysis indicated significant positive relationships between conservation interest variables and environmentally-responsible behavior. Visitors that showed higher interest in wildlife conservation, illegal pet trade and environmental issues reported the most environmentally-responsible behavior. Therefore, visitors that arrive with higher personal interest in conservation issues are more likely to engage in ERB. Results are consistent with Falk and Adelman (2003) stating that visitors with moderate to high interest showed the most changes in conservation interest and concern. Visitors who are interested in conservation issues are more likely to take action to support and protect those causes.

Similarly, visitors with a higher perceived knowledge were more environmentally active. Results indicated significant positive relationships between visitors with higher perceived knowledge of environmental and conservation issues and ERB. Although hedonistic topics were significantly and positively correlated, the conservation knowledge topics were positively and more highly correlated. Yalowitz (2005) stated that conservation-mindedness affects the visitors' retention and reaction to conservation-related material. Those visitors with a higher perceived knowledge are using new information to increase their knowledge base and make decisions about possible conservation-related actions. Falk and Adelman (2003) also noted that visitors with the

most knowledge of conservation issues had significant changes in conservation knowledge after visiting a conservation-related exhibit.

Analysis showed a significant correlation between perceived knowledge and objective knowledge of animal and environmental topics. Results are not consistent with previous research involving information search behavior that found nonsignificant correlations between perceived and objective knowledge (Radecki & Jaccard, 1995). Since perceived knowledge and objective knowledge are positively correlated, decisions made involving zoo related issues should be similar regardless if they are driven by perceived or objective knowledge. Results also indicated that visitors who scored higher on the objective knowledge test were significantly and positively correlated with ERB. Therefore, visitors with higher objective knowledge tend to use that knowledge to make informed decision regarding action behaviors.

Analysis showed a significant positive relationship between visiting all three special exhibits and Behavior 3. However, results indicate that attendance at Dinosaurs is the common factor of significant relationships pertaining to attendance at special exhibits. Significant positive relationships were found when visitors attended just Dinosaurs or any combination of Dinosaurs and Touch or Dr. Zoolittle.

The strongest data points to affirmation. Although very few visitors started a new behavior, many people continued to exhibit environmentally-responsible behavior. Eight of the 21 behaviors showed 50% or more of respondents were continuing to participate in the behavior since visiting the zoo. In these cases, visitors are not learning new behaviors, but their environmentally-responsible behavior is probably being reaffirmed when they

read the conservation messages at the zoo. Affirmation is a necessary part of the learning experience and strengthens pre-existing beliefs (Storksdierck, Ellenbogen & Heimlich, 2005). Therefore, evaluating a program only in terms of the number of visitors who started new behaviors may not be an accurate assessment of the program's effects. Affirmation of existing environmentally-responsible behavior as an outcome of programs should be explicitly included as a measure in future evaluation.

Study limitations

There are several general limitations with the study. First, the study was performed at a single site or zoo limiting the results to that particular location. Second, the study was performed over seven days. Although each day of the week was represented, seven days may not properly represent attendance figures for the whole year or attendance demographics. Also, the study was performed over the summer and no other time of year. Some people may not choose to visit during the summer due to the warmer temperatures or other constraints. These people may be more knowledgeable or strategic both in using zoos or better understand when certain animals are more active due to weather conditions or smaller crowds.

Another limitation was the web-based survey. There were a few minor issues involved in creating and implementing the survey. A few respondents had trouble inputting specific values for a question or even accessing the survey. These were addressed on a case by case basis. Some email addresses were returned due to invalid email addresses or typographic errors. Also, in order to email respondents in a timely

manner, emails containing a large number of respondents had to be sent. Email caught by spam filters became a concern. In general, the response rate was lower that other zoo surveys conducted strictly with mail-back paper surveys by the same institution.

Visitors with 1) an external locus of control or 2) little interest in the zoo not feeling that participating in the survey would make a difference may also be a limitation. Because externals tend to feel as if their opinion does not matter, it seems logical that they would view completing a survey as a waste of time since no one listens to them anyway. Similarly, visitors with little interest in the zoo or its mission may not care to fill out the survey since it is an altruistic activity.

A major constraint of the study was the implementation of the program. Since the program was evaluated based on environmentally-responsible behavior reported after the visit, proper execution of the program elements was extremely important. The program was designed to encourage visitors to take action after leaving the zoo. By watching the Dr. Zoolittle program and visiting the other temporary exhibits, visitors could read and learn about specific environmentally-responsible behaviors to be performed at home. Unfortunately, the implementation had several limitations.

The education department developed an informational brochure to be given to visitors as they entered the zoo. The brochure explained the three temporary summer exhibits and included a worksheet for kids to fill out while visiting the exhibits. Through seven 20 minute observations, between 0 – 40% of entering groups received the brochure from guest service workers at the front gate. During three of the observation times, no brochures were handed out to visitors. During observations at the special exhibits and

throughout the zoo, no visitors were observed viewing the brochure or using the worksheet.

Sign placement was another limitation to effective implementation. At the dinosaur display, an introduction sign was placed at the end of a long bridge on the other side of the walkway. In most cases, the visitors' line of sight should have lead directly to the sign, but just as the visitors stepped off the bridge immediately to their right was a dinosaur that spit water onto visitors and roared. This dinosaur proved to be quite a distraction from the sign that introduced visitors to the "Action is the Key" series of signs they were to encounter in the dinosaur exhibit. Many people crowded around the spitting dinosaur. Some children screamed in terror and others ran around trying to get as wet as possible. Because most people immediately turned their attention to this first animatronic dinosaur, they never read the sign instructing them to look for the action icons throughout the exhibit.

Visitor attendance was a limiting factor for sign usage at Touch. When the wait time was increased due to heavy attendance, visitors paid more attention to the signs throughout the queue as they waited to enter the tent with the touch pool. When attendance was slow, visitors moved through the queue quickly and paid little attention to the signs. During moderate attendance, visitors may have only seen one or two of the conservation messages with the action icon.

Lack of attendance at the three special exhibits also limited the success of the program. Although 82% of survey respondents visited at least one of the three special exhibits, only 13% visited all three exhibits. Consequently, the number of visitors that

started a new environmentally-responsible behavior after their zoo visit was no more than ten people for any one behavior. Because the cell size was so low, the chances of identifying any significant results for Behavior 1 was unlikely. Consequently, it is difficult to make a firm conclusion about the efficacy of the program in terms of starting behaviors.

Application

Environmental socialization looks at how life experiences influence someone to strengthen their attitudes and beliefs and form environmental-related identity (Bixler & Morris, 2000). Identity can be considered a set of meanings or characteristics that define a person. A person's identity and understanding of self can be a primary motivator of behavior (Stets & Burke, 2002; Stets & Biga, 2003). Environmental education strives to impart knowledge that students can use to define their own identities. When individuals identify themselves through environmental consciousness, many times environmental action will follow (Hayes-Conroy & Vanderbeck, 2005). Therefore, environmental education programs should not only assess the success of the programs through participants' environmental behavior but also whether participants identify with environmental norms.

Environmental programs should not be a discrete experience. Visitors to programs should be given examples of opportunities available for them to continue learning or ways to take environmentally-responsible action at home. By suggesting ways for visitors to extend the learning experience, practitioners can increase the chances for the visitor to

make a meaningful connection with the program and its information. Other ways to continue fostering the visitors' interest after the program could be through a special invitation to another program or event that the zoo is hosting. Also, the zoo could provide opportunities to engage in environmentally-responsible behavior through organized events focused on helping wildlife or the environment. These events may be orchestrated by organizations other than the zoo. Technology has also improved ways for visitors to extend the experience by visiting the zoo's website. Zoo cameras provide video of featured animals that can be watched at home, or animal information can be found through navigating the website. More information about ex situ conservation programs may be available including a link to the website for the sponsoring organization.

Parents also play a large role fostering environmental concern in their children. Visiting educational attractions such as museums and nature centers prepare children to make learning a lifelong process. There will be information wherever they go that may spark their curiosity. When families visit national and state parks, children learn the importance of the outdoors and that early-life outdoor experience may cultivate a passion for the environment. Parents may encourage their children to own a pet that demands little attention such as a fish or turtle. Although dogs and cats are common pets in many households, odd but interesting pets like spiders or snakes also teach responsibility and understanding of animals. By owning a variety of pets, children can learn how each animal fits into the ecosystem and what role it plays in balancing the environment. This knowledge can promote environmental concern for the animals and the environment that supports them. The range and diversity of previous behaviors that were slightly to

moderately correlated with the dependent variable suggest that a wide range of childhood and family experiences work to encourage environmental involvement. The major application of findings is that environmental educators need to work meaningful references into their programs and interactions to connect with visitors' previous experiences with pets, outdoor recreation and environmental learning experiences.

Future Research

Based on the results of this study, several suggestions for future research can be made. To get a better understanding of the variables, other questions could be used to explore different dimensions of locus of control, motivation, previous life experiences, personal interest, and perceived knowledge. The knowledge test could contain questions specific to information found throughout the zoo. Each of the independent variables could be explored in terms of different dependent variables such as knowledge retained or environmental identity. Qualitative methods could be used for a deeper understanding of why visitors with specific characteristics tend to exhibit more or less environmentally-responsible behavior.

Further research is needed to explore the role locus of control plays on environmentally-responsible behavior. A comparison of a standard locus of control scale and the environmentally-focused locus of control scale could be used to get a better understanding of a person's locus of control relative to environmental issues. Researchers should also be wary of persons with an external locus of control exhibiting ERB. In cases such as using mass transit or hanging clothes on a clothesline, externals may not be

taking action to protect the environment but because it is more accessible or affordable that alternatives such as buying a car or washer and dryer.

The results of this study showed higher correlations between hedonistic behaviors and ERB than expected. Future research should explore the differences in visitors with a general interest in animals and those with a more conservation-focused interest. It is possible that protective feelings toward wildlife can emerge from experiences with wildlife unaccompanied by conservation-related cognitions.

Zoo camp is another variable that should receive further attention as adults in the sample may not have had opportunities to attend these camps. Since zoo camps have become fairly widespread over the last 15 years, many of the kids that attended camp would be reaching adulthood in the coming years. Therefore, future research will pick up more respondents who participated in zoo camps and its impacts can be assessed.

Another topic for future research could be delving into people who are environmentally active but do not have previous conservation-related experiences. According to environmental socialization literature, environmental experiences help lead a person along the path to become more environmentally aware and concerned. In many cases, this awareness leads to action. More understanding about those without previous environmental experiences is necessary. More research is needed to explore what characteristics or experiences the people with little conservation backgrounds have in common that have made them more environmentally active.

Future studies should address the effects children have over adults' decisions while visiting the zoo and after the visit. If there are children within the visitor groups,

how does this affect whether they read signs or what programs they attend? When they leave the zoo, do adults choose to act in an environmentally-responsible way or can children influence their behavior? Does the age of the children affect decision-making? This research can be used to determine in which situations children can positively influence the adults in their group. In contrast, studies should also address under what circumstances children distract their caregivers from opportunities for conservation-related learning.

Lastly, more research should focus on the importance of affirmation in free-choice learning settings with regards to conservation issues and environmentally-responsible behavior. Since this study shows that few people are starting new behavior, more research should be done to understand what types of affirmative messages increase behavior. Also, by looking at what types of behaviors are reaffirmed through conservation messages, researchers can evaluate what behaviors to focus on and look for new ways to encourage other environmentally-responsible behavior.

Conclusion

Although many visitors do not go to the zoo to fulfill an educational desire, there are many pre-existing factors that prepare visitors to have a meaningful experience. Whether it is a personal interest or past outdoor experience that helps the visitor make a connection, it is important for environmental educators to understand what characteristics influence attitudes and encourage behavior. As zoos begin to play a more vital role in the

public education of wildlife conservation and environmental issues, the need to understand what works and with who becomes increasingly important.

No single experience can change everyone into an avid conservationist. It is the unique combination of experiences that build upon one another to encourage someone to become aware, concerned and eventually take action. An educator can be the next step in the process by helping the visitor connect new information to these past experiences. By understanding that visitors will bring with them a variety of characteristics, zoo educators can tailor a program to offer opportunities for visitors at various stages of the environmental socialization process.

A visit to a zoo or even several visits alone will not change how the world thinks about wildlife and the environment, but each visit provides an environmental socialization incident. Each incident reminds, renews and occasionally expands interest and concern within each individual. The sum of these experiences helps create an appreciation of wildlife and wild places and a desire to protect them.

"Awaken people's curiosity. It is enough to open minds; do not overload them. Put there just a spark." - Anatole France

APPENDIX

A. Satisfaction with your July visit

1. **Please rate your *overall satisfaction* with your Zoo visit below**. Circle one number between 1 and 10 where 1 = extremely dissatisfied and 10 = extremely satisfied.

Extremely Dissatisfied **1 2 3 4 5 6 7 8 9 10** **Extremely Satisfied**

Please circle one number above

2. Please tell us how much you disagree or agree with these statements about your July visit. Choose one answer for each statement.

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
I would recommend the Zoo to others like me	1	2	3	4	5
The Zoo is safe for children and adults alike	1	2	3	4	5
I/we enjoyed my July visit to the Zoo	1	2	3	4	5
I/we learned a lot about wildlife at the Zoo	1	2	3	4	5
I/we had lots of fun at the Zoo in July	1	2	3	4	5
I have shared with others about my July Zoo visit.	1	2	3	4	5

3. Please select ONLY ONE statement below that describes your July Zoo visit.

_____ My July visit was fun.

_____ My July visit was educational.

_____ My July visit was hot and tiring.

B. About your visit

1. Was this your first visit to Cleveland Metroparks Zoo?

_____ Yes—go to question 3

_____ No---go to question 2

2. Including your July visit, how many times had you visited Cleveland Metroparks Zoo in the last 12 months?

_____ # of Zoo visits

3. Approximately how long was your visit to Cleveland Metroparks Zoo in July, to the nearest half-hour?

___.__ hours

4. How many people were in your group? (COUNT YOURSELF, all adults, children, youth and infants)

_____ # of people.

5. On each of the lines below, please tell us the number of people in each age category who came with you on your visit. PLEASE COUNT YOURSELF.

# of People	# of People	# of People
____ less than 4 yrs.	____ 12 to 17 yrs. old	____ 45 to 64 yrs. old
____ 4 to 7 yrs. old	____ 18 to 25 yrs. old	____ 65 to 74 yrs. old
____8 to 11 yrs. old	____ 26 to 44 yrs. old	____ 75 yrs. and over

6. Which exhibits did you visit during your July trip to Cleveland Metroparks Zoo? (check all that apply)

____ Elephants
____ African Savannah
____ Dinosaurs!
____ Rhino building
____ Monkey Island
____ Touch! tent with stingrays/sharks
____ Australian Adventure
____ Lorikeet Aviary
____ Dr. ZooLittle show at the amphitheater
____ Wolf Wilderness
____ Seals and Sea Lions
____ Bear and Tiger Exhibits
____ Primate, Cat & Aquatics Building
____ The RainForest
____ Center for Zoological Medicine

7. Did you visit any of the Cleveland Metroparks gift shops?

_____ Yes—go to question 8 below
_____ No—go to the next page

8. Did you purchase any of the following at the gift shops during your July visit? (check all that apply)

_____ Clothes

_____ Books

_____ Videos

_____ Art/Collectibles

_____ Toys

_____ None of the above

9. Did you visit Dinosaurs! during your July visit to the Cleveland Metroparks Zoo?

_____ Yes—Go to Question 10.

_____ No—Go to Question 11

10. Please tell us about your experience with Dinosaurs! Choose one answer for each statement below.

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
I/we read some of the white "Quest for the Key" signs	1	2	3	4	5
The cost per person was reasonable	1	2	3	4	5
I/we learned some things about Dinosaurs	1	2	3	4	5
I/we better understand abut the extinction of dinosaurs	1	2	3	4	5
I/we read some of the signs about dinosaurs	1	2	3	4	5

11. Did you visit Touch! with sharks and stingrays during your July visit to the Cleveland Metroparks Zoo?

_____ Yes—Go to Question 12

_____ No—Skip to Question 13.

12. Please tell us about your experience with Touch! Choose one answer for each statement below.

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
We felt pressured to leave the tent because of the crowds	1	2	3	4	5
I/we read the "Quest for the Key" signs at the entrance and/or exit to Touch!	1	2	3	4	5
There were enough sharks in the tank	1	2	3	4	5
Touch! was fun	1	2	3	4	5
I/we read the conservation signs	1	2	3	4	5
I/we carefully listened to the education staff talking about the animals	1	2	3	4	5
It was too loud in the tent	1	2	3	4	5
The time we waited to get into Touch! was not too long	1	2	3	4	5
Touch! was educational	1	2	3	4	5

13. Did you attend Dr. Zoolittle's Quest for the Key at the Zoo Amphitheater?

____ Yes—go to 14

____ No—skip to next Section (C) next page

14. Tell us about your experience with the Dr. ZooLittle "Quest for the Key" show.

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
The show held my/our attention	1	2	3	4	5
I/we enjoyed seeing the animals perform	1	2	3	4	5
The show was too preach about wildlife conservation	1	2	3	4	5
I wish the show had been longer	1	2	3	4	5
More animals would have improved the show	1	2	3	4	5
I told my friends about the show after my July visit	1	2	3	4	5
I got what the actors meant by "Quest for the Key to the Future of Wildlife"	1	2	3	4	5

What did you and your group get out of going to the Dr. ZooLittle show?

_____

_____

_____

_____

_____

What do you think the Zoo wanted the audience to learn from the show?

_____

_____

_____

_____

C. Visiting the Zoo, Other Zoos and Other Attractions

1. Are you a Cleveland Zoological Society Member?

_____ Yes—skip to question 4

_____ No—go to question 2

2. Are you a member of another zoo that allows you to visit Cleveland Metroparks Zoo at a free or lower entrance fee?

_____ Yes—go to question 3.

_____ No—skip to question 4.

3. If so, what other zoo are you a member of? _____ name of zoo

4. How many DIFFERENT ZOOS have you visited in the last three years? (best guess)

_____ number of zoos

5. Counting all the different zoos you have visited, how many TOTAL VISITS have you made to zoos in the last three years? (best guess)

_____ number of visits to all zoos

6. How important are these reasons for you visiting zoos now and in the future? (Choose one answer for each statement)

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
To enjoy being with family or friends	SD	D	N	A	SA
To enjoy my children's reactions to the animals	SD	D	N	A	SA
To learn about animals	SD	D	N	A	SA
To learn about wildlife conservation	SD	D	N	A	SA
To have fun	SD	D	N	A	SA
To attend special zoo events and exhibits	SD	D	N	A	SA
To enjoy the hustle and bustle of a place filled with people	SD	D	N	A	SA
Just to get out of the house and do something different	SD	D	N	A	SA

7. What other places or events have you visited in the last 3 years? (check all that apply)

____ Natural History Museums
____ Art Museums
____ National Parks
____ Botanical Gardens
____ State Parks
____ Popular Music Concerts
____ Library
____Classical Music Concerts
____ Golf Course
____ Children's Museums
____ High School Sporting Events
____ Weekend Festivals
____ College Sporting Events
____ Nature Centers
____ Professional Sporting Events
____ Auto Racing
____ Science Museums
____ Amusement/Theme Parks
____ Aquariums
____ None of the Above

8. What was the most memorable moment of your July Cleveland Metroparks Zoo visit?

_____

_____

_____

9. Was there a special type of experience with wildlife you wanted from your zoo visit? Please describe below.

_____

_____

_____

10. For you, what kind of experiences would an ideal Zoo offer? Please describe below.

_____

_____

_____

11. Have you had an experience anytime during your life that inspired you to support a wildlife conservation cause? Please describe below.

_____

_____

_____

D. Help us make future Zoo visits fun and educational for everyone!

1. Did you have a pet as a child?

____ Yes—go to question 2

____ No—go to question 3

2. What type of pets did you own? (check all that apply)

____ Dog
____ Cat
____ Ferret
____ Fish
____ Bird
____ Snake
____ Turtle
____ Lizard
____ Frog
____ Salamander
____ Insect
____ Spider or Tarantula
____ Livestock (chicken, duck, cow, horse, goat, etc)
____ Other, please list _____

3. Before the age of 14, how many times (best guess) had you visited zoos with FAMILY AND FRIENDS?

_____ number of visits

4. Before the age of 14, how many times (best guess) had you visited with a SCHOOL GROUP?

____ number of visits

5. In elementary school, did any of your teachers have a pet animal in the classroom?

____ Yes—What kind of pet animal? _____

____ No

6. As a child, what types of camps did you go to in the summer?

____ None
____ Local day camp
____ Traditional overnight camp
____ Scout overnight camp
____ Zoo camp
____ Sports camp
____ Music camp
____ other type of camp

7. Where you involved for at least two years in a scouting group such as Brownies, Girl Scouts, Cub Scouts, Boy Scouts, Weeblos, etc.

____ Yes

____ No

8. In elementary, junior high or middle school did you have a teacher who taught a lot about CONSERVATION OR ENVIRONMENTAL compared to other teachers?

____ Yes

____ No

9. In elementary, junior high or middle school did you have a teacher who taught a lot about WILDLIFE compared to other teachers?

____ Yes

____ No

E. Knowledge and Interests about Wildlife

1. How interested are you in the following topics?

	No Interest	Somewhat Interested	Very Interested
Common pets	1	2	3
Exotic pets	1	2	3
Funny things animals do	1	2	3
Training animals	1	2	3
Wildlife conservation	1	2	3
Animal welfare	1	2	3
Illegal pet trades	1	2	3
Environmental issues	1	2	3

2. How much do you KNOW about the same topics as above?

	No Knowledge	Somewhat knowledgeable	Very Knowledgeable
Common pets	1	2	3
Exotic pets	1	2	3
Funny things animals do	1	2	3
Training animals	1	2	3
Wildlife conservation	1	2	3
Animal welfare	1	2	3
Illegal pet trades	1	2	3
Environmental issues	1	2	3

3. Please answer these statements with either agree, disagree, or not sure.

	Agree	Disagree	Not sure
Cheetahs are the fastest land mammals	1	2	3
Spiders are insects	1	2	3
Pollution is the main reason elephants are endangered	1	2	3
Termites living in the woods are harmful to the environment	1	2	3
It's okay for people to remove endangered species from the wild as long as they are given proper care	1	2	3
Bears are carnivores (meat eaters)	1	2	3
The rainforests are the world have the highest number (diversity) of plants and animals	1	2	3
It helps the environment to feed deer during the winter in places like Ohio	1	2	3
All bat species drink blood at least sometimes	1	2	3
Butterflies are insects	1	2	3
If you remove all the large predators (wolves, coyotes, cougars, etc.) from natural places, the number of healthy deer would go up	1	2	3
Primates such as chimpanzees use tools to find food	1	2	3

4. Did you hear about "Live Earth: The Concerts for a Climate in Crisis" show on television

____ Yes—If so, did you watch any of the live Earth concerts on television? ____ Yes ____ No

____ No

5. What do you think of the educational signs at the Zoo? (check all that apply)

____ I/we did not look at the signs
____ Too many signs
____ Not enough signs
____ The signs answered my questions
____ Educational
____ Funny
____ Boring
____ Interesting
____ Too long
____ The signs did not answer my questions
____ Not enough information on them
____ Too many photos, maps or art work
____ Not enough photos, maps or art work
____ Too many big words
____ I am not that interested in scientific stuff
____ None of the above

6. Tell us about your contact with EDUCATION staff and docents at the Zoo? (check all that apply)

____ We did not talk with educators or docents
____ We sought them out
____ We tried to ignore them
____ They were fun to listen to
____ At times they were boring
____ They seemed knowledgeable
____ They were engaging
____ We learned a lot from them
____ They gave out too much information
____ We could not find them when we wanted info
____ I am not that interested in scientific stuff
____ None of the above

7. Please tell us if you agree or disagree with the following statements

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Wildlife species are going to become extinct no matter what I do	1	2	3	4	5
More education will help save wildlife species	1	2	3	4	5
Voting for politicians concerned with environmental issues can help save wildlife	1	2	3	4	5
The future of wildlife is partially up to me	1	2	3	4	5
Wildlife becoming rare are due to us not taking enough interest in them	1	2	3	4	5
Wildlife extinction is more likely to be caused by chance as by what people do	1	2	3	4	5
No matter how hard we try to save endangered species, many species are going to become extinct anyway	1	2	3	4	5
Voting in elections can help protect wildlife	1	2	3	4	5
There is not much the common person can do to save endangered species	1	2	3	4	5
I can do little about the selfish people who threaten the existence of wildlife species	1	2	3	4	5

8. How much do you know about these topics?

	No Knowledge	Heard of it but know little	Somewhat Knowledgeable	Very Knowledgeable
Biodegradable soap	1	2	3	4
Environmentally friendly lawn and garden products	1	2	3	4
Problems caused by lead used in hunting and fishing	1	2	3	4
Sustainable wood products	1	2	3	4
Conservation of fossil fuels	1	2	3	4
Sustainable fish harvesting (Seafood Watch)	1	2	3	4
Water conservation	1	2	3	4
Human causes of extinction of species	1	2	3	4
Every animal has a niche	1	2	3	4

9. Which activities below have you started or increased/decreased due to something you learned during your July Zoo visit?

	NEVER have participated	Already doing: NO CHANGE	DECREASED after Zoo visit	INCREASED after zoo visit	STARTED after Zoo visit
Becoming a member of a zoo	Never	No change	Decrease	Increase	Started
Donating to environmental or conservation causes	Never	No change	Decrease	Increase	Started
Volunteering for environmental or conservation organizations	Never	No change	Decrease	Increase	Started
Water conservation	Never	No change	Decrease	Increase	Started
Creating a backyard habitat	Never	No change	Decrease	Increase	Started
Cleaning up pollution	Never	No change	Decrease	Increase	Started
Planting trees	Never	No change	Decrease	Increase	Started
Car pool or using mass transit	Never	No change	Decrease	Increase	Started
Picking up litter	Never	No change	Decrease	Increase	Started
Energy conservation	Never	No change	Decrease	Increase	Started
Using Seafood Watch cards when purchasing fish and seafood	Never	No change	Decrease	Increase	Started
Purchasing sustainable woods	Never	No change	Decrease	Increase	Started
Using environmentally-safe soap and detergent	Never	No change	Decrease	Increase	Started
Using a professional car wash instead of washing car at home	Never	No change	Decrease	Increase	Started
Recycling (aluminum, glass, paper or plastic, etc.)	Never	No change	Decrease	Increase	Started
Using alternatives to lead-based shot when hunting or fishing	Never	No change	Decrease	Increase	Started
Reading about wildlife or the environment in books or internet	Never	No change	Decrease	Increase	Started
Watching wildlife or environmental programs on television	Never	No change	Decrease	Increase	Started
Visiting an environmental group's website to learn more	Never	No change	Decrease	Increase	Started
Providing or protecting habitat for local wildlife	Never	No change	Decrease	Increase	Started
Supporting legislation on wildlife conservation issues	Never	No change	Decrease	Increase	Started

F. Five quick questions to make sure we are serving everyone

Note: The following questions are being asked to ensure that the Zoo serves all types of visitors and to assist in promoting its programs to diverse audiences.

1. Gender: ____ Female ____ Male

2.. Year of birth: 19 __ __

3. What is the highest level of education you have completed?

____ some high school
____ high school graduate
____ some college
____ Associate/technical degree
____ college graduate
____ some graduate school
____ masters degree
____ Ph.D.

4. What is your approximate yearly income for your household?

____ Less than $30,000

____ $30,000 to $69,000

____ $70,000 or more

5. What is your race or ethnicity?

____ Black or African-American
____ White
____ Hispanic or Latino
____ Asian
____ American Indian or Native American
____ Other:_____

Circle one number between 1 and 10 where 1 = extremely boring and 10 = extremely interesting.

Extremely Boring **1 2 3 4 5 6 7 8 9 10** **Extremely Interesting**

Please circle one number above

Please use the additional space below for further comments or suggestions you have about your visit to Cleveland Metroparks Zoo.

Thank you for helping us improve the future for wildlife at Cleveland Metroparks Zoo!

Please return this questionnaire in the enclosed, postage-paid envelope. If the envelope is missing, please mail to: Research and Program Evaluation, Cleveland Metroparks, 4101 Fulton Parkway, Cleveland OH 44144.

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